AMENDMENTS TO THE CLAIMS

1. (Previously presented) An image sensor comprising:

a substrate formed over a base layer;

a plurality of pixel cells formed within said substrate, each pixel cell comprising a photo-conversion device having a charge collection region of a second conductivity type for accumulating photo-generated charge formed in said substrate below a first layer of a first conductivity type; and

a plurality of trenches, each trench being provided along a perimeter of a respective pixel cell, each trench extending at least to a surface of the base layer and below a lower level of said photo-conversion device, each trench having sidewalls, and being at least partially filled with a material that inhibits electrons from passing through said trench,

wherein each of said plurality of trenches prevents diffusion of photo-generated charge generated by said photo-conversion device in one pixel cell to an adjacent pixel cell.

2. (Original) The sensor of claim 1, further comprising a dielectric material formed along at least a portion of said sidewalls.

3. (Original) The sensor of claim 2, wherein the dielectric material is an oxide.

4. (Previously presented) The sensor of claim 2, wherein the dielectric material is formed on the sidewalls of the trench but not on a bottom of the trench.

5. (Previously presented) The sensor of claim 2, wherein the dielectric material comprises at least two materials having different indices of refraction.

6. (Original) The sensor of claim, 1 wherein said material is a conductive material.

7. (Original) The sensor of claim 6, wherein said conductive material comprises one of doped polysilicon, undoped polysilicon and boron-doped carbon.

8. (Original) The sensor of claim 1, wherein said trench has a depth greater than about 2000 Angstroms.

9. (Original) The sensor of claim 8, wherein said trench has a depth in the range of about 4000 to about 5000 Angstroms.

10. (Original) The sensor of claim 1, wherein the sensor comprises a CMOS image sensor.

11. (Original) The sensor of claim 1, wherein the sensor comprises a CCD image sensor.

12. (Previously presented) The sensor of claim 1, wherein the pixel cells are red pixel cells of a Bayer pattern.

13. (Previously presented) The sensor of claim 1, further comprising a contact adjacent at least one of the plurality of trenches, for biasing the material within the trench positive or negative.

14. (Previously presented) A structure for isolating an active area on a semiconductor device, said structure comprising:

a photo-conversion device comprising a doped charge collection region of a second conductivity type for accumulating charge formed in said active area below a first region of a first conductivity type;

a trench formed in a substrate along at least a portion of a periphery of said active area in said semiconductor device, wherein said trench extends at least to a surface of a base layer below said substrate which is below a lower level of said photo-conversion device, and wherein said trench has sidewalls;

a dielectric liner formed along said sidewalls; and

a material formed over said dielectric liner that at least partially fills said trench and inhibits electrons from passing through said trench,

wherein said trench prevents diffusion of electrons from said doped charge collection region into a region outside said active area.

15. (Original) The structure of claim 14, wherein the dielectric liner comprises an oxide material.

16. (Previously presented) The structure of claim 14, wherein the dielectric liner is one of high-density plasma oxide and spin-on dielectric oxide.

17. (Previously presented) The structure of claim 14, wherein the dielectric liner is formed of a material selected from the group consisting of silicon dioxide, aluminum oxide, undoped polysilicon, silicon nitride, PE-oxide and FSG-oxide.

18. (Previously presented) The structure of claim 14, wherein the dielectric liner is formed of at least two materials having different indices of refraction.

19. (Previously presented) The structure of claim 14, wherein the dielectric liner is formed of PE-oxide and FSG-oxide.

20. (Original) The structure of claim 14, wherein the material is a conductive material.

21. (Previously presented) The structure of claim 20, wherein the conductive material comprises one of doped polysilicon, undoped polysilicon and boron-doped carbon.

22. (Original) The structure of claim 14, wherein the trench has a depth greater than about 2000 Angstroms.

23. (Original) The structure of claim 22, wherein the trench has a depth in the range of about 4000 to about 5000 Angstroms.

24. (Original) The structure of claim 14, wherein the semiconductor device comprises one of a CMOS image sensor or a CCD image sensor.

25. (Previously presented) The structure of claim 14, further comprising a contact adjacent the trench, for biasing the material within the trench positive or negative.

26. (Previously presented) A processing system, said processing system comprising:

a processor;

a semiconductor device;

a trench formed in a substrate along at least a portion of a periphery of said active area in said semiconductor device, the active area having a photo-conversion device comprising a charge collection region of n-type conductivity for accumulating charge and located below a p-type region of said active area, wherein said trench extends at least to a surface of a base layer below said substrate and to a level below a lower level of said photo-conversion device, and wherein said trench has sidewalls and inhibits diffusion of charge outside said active area;

a dielectric liner formed along said sidewalls; and

a material formed over said insulating liner that at least partially fills said trench.

27. (Original) The processing system of claim 26, wherein the dielectric liner is an oxide material.

28. (Previously presented) The processing system of claim 26, wherein the dielectric liner is one of high-density plasma oxide and spin-on dielectric oxide.

29. (Original) The processing system of claim 26, wherein the conductive material comprises one of doped polysilicon, undoped polysilicon and boron-doped carbon.

30. (Original) The processing system of claim 26, wherein the trench has a depth greater than about 2000 Angstroms.

31. (Original) The processing system of claim 30, wherein the trench has a depth in the range of about 4000 to about 5000 Angstroms.

32. (Original) The processing system of claim 26, wherein the semiconductor device comprises a CMOS image sensor.

33. (Original) The processing system of claim 26, wherein the semiconductor device comprises a CCD image sensor.

34. (Previously presented) The processing system of claim 26, wherein the dielectric liner comprises at least two materials having different indices of refraction.

35. (Previously presented) The processing system of claim 26, wherein the dielectric liner comprises PE-oxide and FSG-oxide.

36. (Previously presented) The processing system of claim 26, wherein the dielectric liner is provided along the sidewalls of the trench but not on a bottom of the trench.

37-51. (Canceled)

52. (Previously presented) The sensor of claim 1, wherein the base layer is an epitaxial layer.

53. (Previously presented) The sensor of claim 2, wherein said dielectric material formed is substantially conformal such that thickness of said dielectric material is substantially same along said sidewalls and a bottom of said trench.

54. (Previously presented) The sensor of claim 53, wherein thickness of said dielectric material along said sidewalls is at least about 100 Angstroms.